

REMARKS

Applicant respectfully requests entry of the following remarks and reconsideration of the subject application. Applicant respectfully requests entry of the amendments herein. The remarks and amendments should be entered under 37 C.F.R. §1.116 as they place the application in better form for appeal, or for resolution on the merits.

Applicant respectfully requests reconsideration and allowance of all of the claims of the application. Claims 2, 3, 5-16, 18-20, 24, 25, 27-32, 35, 36, 40, 41, and 43 are presently pending. Claims amended herein are 18-20, and 25. Claims cancelled herein are 1, 4, 17, 21-23, 26, 33, 34, 37-39, and 42. New claims added herein are none.

The Applicant expressly grants permission to the Office to interpret all pending claims of this application.

Herein, the "Action" or "Office Action" refers to the Office Action dated January 2, 2003.

Allowable Subject Matter

Applicant appreciates the Office's acknowledgement that claims 2, 3, 5-16, 24, 27-32, 35, 36, 40, 41, and 43 are allowable as is.

Applicant also appreciates the Office's statement that claims 18-20 and 25 would be allowable if rewritten in independent form. Accordingly, Applicant amends these claims to place them into independent form. These amendments do not narrow or broaden the scope of these claims since they merely move the text of the base claims into the body of the formerly dependent claims.

1 **Prior Art Status of References**

2 Applicant does not explicitly or implicitly admit that any reference is prior
3 art. Nothing in this communication should be considered an acknowledgement,
4 acceptance, or admission that any reference is considered prior art.

5 **Traversal of Official Notices**

6
7 In this Office Action, the Office rejects claims 15, 19 and 20, at least in
8 part, by taking Official Notice.

9 Applicant maintains its traversal of the Official Notices. If facts are well-
10 known to those of ordinary skill in the art, then Applicant asks the Office to cite
11 one or more references to support that assertion.

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Substantive Claim Rejections

Claim Rejections under §102 and §103

The Office rejects all pending claims under §102 and §103. For the reasons set forth below, the Office has not made out a *prima facie* case of anticipation (i.e., §102). Likewise, for the reasons set forth below, the Office has not made out a *prima facie* case of obviousness (i.e., §103). Accordingly, Applicant respectfully requests that the rejections be withdrawn and the case be passed along to issuance.

The Office's rejections are based upon one or more of the following references (in combination or alone):

- **Bloom:** *Bloom et al.*, US Patent No. 6,332,194;
- **Mintzer:** *Mintzer et al.*, "If One Watermark is Good, Are More Better?", Acoustic, Speech, and Signal Processing, vol. 4, pp. 2067-2069, 1999; and
- **Levine:** *Levine et al.*, US Patent No. 6,209,094.

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Anticipation Rejections

§102 Rejections based upon Bloom

The Office rejects claims 1, 4, 17, 21-23, 26, 33, 34, and 37 under 35 USC §102(e) as being clearly anticipated by Bloom. Applicant reserves the right to file a §131 declaration.

To hasten the issuance for the claims allowed at this point, Applicant withdraws claims 1, 4, 17, 21-23, 26, 33, 34, and 37 from consideration. However, Applicant reserves the right to re-introduce these claims in a subsequently filed continuation-type application.

§102 Rejections based upon Mintzer

The Office rejects claims 26, 34, and 37 under 35 USC §102(a) as being clearly anticipated by Mintzer.

Again, to hasten the issuance for the claims allowed at this point, Applicant withdraws claims 1, 4, 17, 21-23, 26, 33, 34, and 37 from consideration. However, Applicant reserves the right to re-introduce these claims in a subsequently filed continuation-type application.

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Obviousness Rejections

The Office Has Not Made Out a Case of Prima Facie Obviousness

Applicant disagrees with the Office's obviousness rejections and respectfully submits that the Office has not made out a *prima facie* case of obviousness. Accordingly, Applicant respectfully requests withdrawal of these rejections.

§103 Rejections based upon Mintzer and Levine

The Office rejects claims 38-39 and 42 under 35 USC §103(a) as being unpatentable over Mintzer in view of Levine.

Levine is not concerned with multiple disparate watermarks. Rather, it is focused on increasing the robustness of a watermark in an audio signal and thereby making it more difficult to attack. Therefore, Levine's discussion (in lines 45-51 of col. 5) about audible range of the human listener is emphasizing the benefits of embedding watermarks in the audible range to enhance their robustness.

Mintzer is about layering multiple marks, but no distinction is made as to where. Levine is about inserting a single mark in a particular portion of a signal. Combining to two produces a system that layers multiple watermarks in a particular portion of a signal. That is not what these claims cover.

Applicant submits that Mintzer and Levine reveal no motivation to combine their teachings. Furthermore, the combination of these teachings does not result in

1 what is recited by this claim. Accordingly, these claims are not obvious for the
2 above reasons.

3 However, to hasten the issuance for the claims allowed at this point,
4 Applicant withdraws claims 38, 39, and 42 from consideration. However,
5 Applicant reserves the right to re-introduce these claims in a subsequently filed
6 continuation-type application.

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8 **§103 Rejections based upon Bloom and Levine**

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10 The Office rejects claims 38-39 and 42 under 35 USC §103(a) as being
11 unpatentable over Bloom in view of Levine.

12 Levine is discussed above.

13 Bloom is about layering multiple marks, but no distinction is made as to
14 where. Levine is about inserting a single mark in a particular portion of a signal.
15 Combining to two produces a system that layers multiple watermarks in a
16 particular portion of a signal. That is not what these claims cover.

17 Applicant submits that Bloom and Levine reveal no motivation to combine
18 their teachings. Furthermore, the combination of these teachings does not result in
19 what is recited by this claim. Accordingly, these claims are not obvious for the
20 above reasons.

21 However, to hasten the issuance for the claims allowed at this point,
22 Applicant withdraws claims 38, 39, and 42 from consideration. However,
23 Applicant reserves the right to re-introduce these claims in a subsequently filed
24 continuation-type application.
25

1 **Dependent Claims**

2 In addition to other possible reasons, each dependent claim is allowable for
3 the same reasons that its base claim is allowable. Applicant submits that the
4 Office withdraw the rejection of each dependent claim where its base claim is
5 allowable.
6

7 **Claim Amendments**

8 All of the claim amendments are done to make the claim language more
9 readable, linguistically clearer, and/or grammatically correct. None of the
10 amendments is done to meet any statutory requirement. None narrows the scope of
11 the claims.

12 All of the amended claims (18-20, and 25) were amended for other similar
13 reasons.
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1 Conclusion

2 All pending claims are in condition for allowance. Applicant respectfully
3 requests reconsideration and prompt issuance of the application. If any issues
4 remain that prevent issuance of this application, the Office is urged to contact the
5 undersigned attorney before issuing a subsequent Action.

6
7 Respectfully Submitted,

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9 Dated: 4-02-03

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Amendments in Marked-Up Form:

Amendments hereafter are in *Marked-up Form* (i.e., with markings to indicate the changes that have been made). Specification is amended in accordance with 37 CFR §1.121(b) and claim(s) are amended in accordance with 37 CFR §1.121(c).

In the Specification (in Marked-up Form):

None.

Amended Claims (in Marked-up Form):

Please amend claims 18-20, and 25 as indicated below:

1. (cancelled)

2. (previously amended) An audio watermarking system comprising:

a pattern generator to generate both a strong watermark and a weak watermark; and

a watermark insertion unit to insert the strong watermark and the weak watermark into the audio signal,

wherein the watermark insertion unit selectively inserts either the strong watermark or the weak watermark into segments of the signal according to an audible measure of the segments.

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1 **3. (previously amended)** An audio watermarking system comprising:

2 a pattern generator to generate both a strong watermark and a weak
3 watermark;

4 a watermark insertion unit to insert the strong watermark and the weak
5 watermark into the audio signal;

6 a processor to determine a hearing threshold for the audio signal; and

7 the watermark insertion unit inserts the strong watermark when the signal
8 exceeds the hearing threshold and inserts the weak watermark when the signal
9 falls below the hearing threshold.

10
11 **4. (cancelled)**

12
13 **5. (previously amended)** An audio watermark encoding system
14 comprising:

15 a converter to convert an audio signal into magnitude and phase
16 components;

17 a mask processor to determine a hearing threshold for corresponding
18 magnitude components;

19 a pattern generator to generate both a strong watermark and a weak
20 watermark; and

21 a watermark insertion unit to selectively insert one of either the strong
22 watermark or the weak watermark into the audio signal based on whether the
23 magnitude components exceed or fall below the hearing threshold.

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1 6. An audio watermark encoding system as recited in claim 5, wherein
2 the watermark insertion unit inserts the strong watermark when the magnitude
3 component exceeds the hearing threshold and inserts the weak watermark when
4 the magnitude component falls below the hearing threshold.

5
6 7. An audio watermark encoding system as recited in claim 5, wherein
7 the watermark insertion unit inserts the strong watermark when the magnitude
8 component exceeds the hearing threshold by a predetermined amount and inserts
9 the weak watermark when the magnitude component falls below the hearing
10 threshold by the predetermined amount.

11
12 8. An audio watermark encoding system as recited in claim 5, wherein
13 the watermark insertion unit foregoes inserting the strong watermark or the weak
14 watermark when the magnitude component lies within the predetermined amount
15 above and below the hearing threshold.

16
17 9. An audio encoding system comprising:
18 an audio watermark encoding system as recited in claim 5; and
19 a compression unit, wherein the compression unit and the audio watermark
20 encoding system both utilize the magnitude components.

21
22 10. An operating system comprising an audio watermark encoding
23 system as recited in claim 5.
24
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1 **11. (previously amended)** A watermark insertion unit, comprising:

2 an input to receive frequency magnitude components of an audio signal,
3 hearing thresholds derived from the magnitude components, strong watermark
4 values, and weak watermark values; and

5 multiple insertion operators for selectively combining the magnitude
6 components and one of either the strong watermark values or the weak watermark
7 values depending upon whether the magnitude components exceed or fall below
8 the hearing thresholds.

9
10 **12. (previously amended)** An audio watermark detection system,
11 comprising:

12 an input module configured to receive a watermarked audio signal;

13 a synchronization module configured to determine which portion of the
14 watermarked audio signal might contain a watermark; and

15 a correlation module configured to detect whether a watermark is present in
16 the portion of the watermarked audio signal that the synchronization module
17 determines might contain a watermark and, if a watermark is detected, further
18 configured to determine whether that watermark is either a strong watermark or a
19 weak watermark.
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1 **13. (previously amended)** An audio watermark detection system as
2 recited in claim 12, wherein the correlation module is further configured to
3 compute a correlation value from the watermarked audio signal and the strong
4 watermark that tends toward a first value when the strong watermark is present
5 and a second value when the strong watermark is not present.

6
7 **14. (previously amended)** An audio watermark detection system as
8 recited in claim 12, wherein the correlation module is further configured to
9 compute a correlation value from the watermarked audio signal and the weak
10 watermark that tends toward a first value when the weak watermark is present and
11 a second value when the weak watermark is not present.

12
13 **15. (previously amended)** An audio watermark detection system as
14 recited in claim 12, wherein the correlation module is further configured to
15 compute a correlation value from the watermarked audio signal and one of either
16 the strong watermark or the weak watermark, the correlation module determining
17 that said one strong watermark or weak watermark is present when the correlation
18 value exceeds a predetermined threshold plus a random amount.

19
20 **16.** An operating system comprising an audio watermark detection
21 system as recited in claim 12.

22
23 **17. (cancelled)**

1 **18. (re-presented in independent form)** An audio watermark
2 detection system comprising: ~~as recited in claim 17,~~

3 a pattern generator configured to generate both a strong watermark and a
4 weak watermark; and

5 a watermark detector configured to detect whether a watermark is present in
6 a portion of the watermarked audio signal and, if a watermark is detected, further
7 configured to determine whether that watermark is either a strong or a weak
8 watermark,

9 wherein the watermark detector is further configured to compute correlation
10 values from the watermarked audio signal and each of the strong watermark and
11 the weak watermark and to determine whether that watermark is either the strong
12 watermark or the weak watermark based on whether the correlation values exceed
13 a predetermined threshold.

14
15 **19. (re-presented in independent form)** An audio watermark
16 detection system as recited in claim 17, further comprising:

17 a pattern generator configured to generate both a strong watermark and a
18 weak watermark; and

19 a watermark detector configured to detect whether a watermark is present in
20 a portion of the watermarked audio signal and, if a watermark is detected, further
21 configured to determine whether that watermark is either a strong or a weak
22 watermark;

23 a random operator for generating a random value; and

24 the watermark detector being further configured to compute correlation
25 values from the watermarked audio signal and each of the strong watermark and

1 the weak watermark and to determine whether that watermark is either the strong
2 watermark or the weak watermark based on whether the correlation values exceed
3 a predetermined threshold plus the random value.

4
5 **20. (re-presented in independent form)** An audio decoding system
6 comprising:

7 an audio watermark detection system comprising: as recited in claim 17;

8 a pattern generator configured to generate both a strong watermark
9 and a weak watermark; and

10 a watermark detector configured to detect whether a watermark is
11 present in a portion of the watermarked audio signal and, if a watermark is
12 detected, further configured to determine whether that watermark is either a
13 strong or a weak watermark;

14 a converter configured to convert a watermarked audio signal into
15 magnitude and phase components;

16 a mask processor configured to determine a hearing threshold for
17 corresponding magnitude components; and

18 a decompression unit, wherein the decompression unit and the audio
19 watermark detection system both utilize the magnitude components.

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21 **21. (cancelled)**

22
23 **22. (cancelled)**
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25

1 **23. (cancelled)**

2
3 **24. (previously amended)** An audio watermarking architecture
4 comprising:

5 a watermark encoding system configured to selectively insert either a
6 strong watermark or a weak watermark into segments of an audio signal; and

7 a watermark detecting system configured to detect a presence of either the
8 strong watermark or the weak watermark in the segments of the audio signal

9 wherein the watermark encoding system comprises:

10 a converter configured to convert the audio signal into magnitude
11 and phase components;

12 a mask processor configured to determine a hearing threshold for
13 corresponding magnitude components;

14 a pattern generator configured to generate both the strong watermark
15 and the weak watermark; and

16 a watermark configured insertion unit to selectively insert one of
17 either the strong watermark or the weak watermark into the audio signal
18 based on whether the magnitude components exceed or fall below the
19 hearing threshold.
20

21 **25. (re-presented in independent form)** An audio watermarking
22 architecture ~~as recited in claim 22, wherein the watermark detecting system~~
23 ~~comprises~~ comprising:

24 a watermark encoding system configured to selectively insert either a
25 strong watermark or a weak watermark into segments of an audio signal; and

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1 a watermark detecting system configured to detect a presence of either the
2 strong watermark or the weak watermark in the segments of the audio signal

3 wherein the watermark detecting system comprises:

4 a converter configured to convert a watermarked audio signal into
5 magnitude and phase components;

6 a mask processor configured to determine a hearing threshold for
7 corresponding magnitude components;

8 a pattern generator configured to generate both a strong watermark
9 and a weak watermark; and

10 a watermark detector configured to detect whether a watermark is
11 present in a portion of the watermarked audio signal and, if a watermark is
12 detected, further configured to determine whether that watermark is either
13 the strong or the weak watermark.

14
15 **26. (cancelled)**

16
17 **27. A method for watermarking an audio signal, comprising:**

18 comparing samples of the audio signal to a hearing threshold;

19 watermarking samples exceeding the hearing threshold with a strong
20 watermark; and

21 watermarking samples falling below the hearing threshold with a weak
22 watermark.

1 28. A method as recited in claim 27, wherein the watermarking samples
2 comprises:

3 watermarking samples exceeding the hearing threshold plus a buffer value
4 with a strong watermark;

5 watermarking samples falling below the hearing threshold by less than the
6 buffer value a with a weak watermark; and

7 leaving samples lying within the buffer value above and below the hearing
8 threshold without a watermark.

9
10 29. A method as recited in claim 27, further comprising detecting the
11 strong watermark and the weak watermark in the audio signal.

12
13 30. A method as recited in claim 27, wherein the detecting comprises
14 computing a correlation value from the audio signal and the strong watermark, the
15 correlation value tending toward a first value when the strong watermark is present
16 and a second value when the strong watermark is not present.

17
18 31. A method as recited in claim 27, wherein the detecting comprises
19 computing a correlation value from the audio signal and the weak watermark, the
20 correlation value tending toward a first value when the weak watermark is present
21 and a second value when the weak watermark is not present.

1 **32.** A method as recited in claim 27, further comprising:
2 computing a correlation value from the audio signal and one of the strong
3 watermark or the weak watermark; and
4 determining that said one strong watermark or weak watermark is present
5 when the correlation value exceeds a predetermined threshold plus a random
6 amount.

7
8 **33.** (cancelled)

9
10 **34.** (cancelled)

11
12 **35.** A computer readable medium having computer executable
13 instructions for:
14 comparing samples of an audio signal to a hearing threshold;
15 watermarking samples exceeding the hearing threshold with a strong
16 watermark; and
17 watermarking samples falling below the hearing threshold with a weak
18 watermark.

19
20 **36.** 21 a pattern generator to generate both a strong watermark and a weak
22 watermark; and
23 a watermark insertion unit to insert the strong watermark and the weak
24 watermark into the audio signal,
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1 wherein the watermark insertion unit selectively inserts either the strong
2 watermark or the weak watermark into segments of the signal according to an
3 audible measure of the segments.

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5 **37. (cancelled)**

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7 **38. (cancelled)**

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9 **39. (cancelled)**

10
11 **3 40. (previously amended)** An audio watermarking system
12 comprising:

13 a pattern generator configured to generate both a strong watermark and a
14 weak watermark; and

15 a watermark insertion unit configured to insert the strong watermark into
16 one or more first segments of the audio signal and to insert the weak watermark
17 into one or more second segments of the audio signal, wherein the first and second
18 segments are separate, wherein the watermark insertion unit selectively chooses
19 segments for insertion of the weak watermark according to an audible measure of
20 the segments.

21
22 **4 41. (previously amended)** An audio watermarking system comprising:

23 a pattern generator configured to generate both a strong watermark and a
24 weak watermark; and
25

1 a watermark insertion unit configured to insert the strong watermark into
2 one or more first segments of the audio signal and to insert the weak watermark
3 into one or more second segments of the audio signal, wherein the first and second
4 segments are separate;

5 a processor configured to determine a hearing threshold for segments of the
6 audio signal; and

7 the watermark insertion unit being further configured to insert the strong
8 watermark into a segment when the signal of that segment exceeds the hearing
9 threshold and inserts the weak watermark into a segment when the signal of that
10 segment falls below the hearing threshold.

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12 **42. (cancelled)**

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14 **43. A method as recited in claim 27, further comprising:**

15 computing a correlation value from the audio signal and one of either the
16 strong watermark or the weak watermark; and

17 determining that either said one strong watermark or said one weak
18 watermark is present when the correlation value exceeds a predetermined
19 threshold plus a random amount.
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